FIG. 1

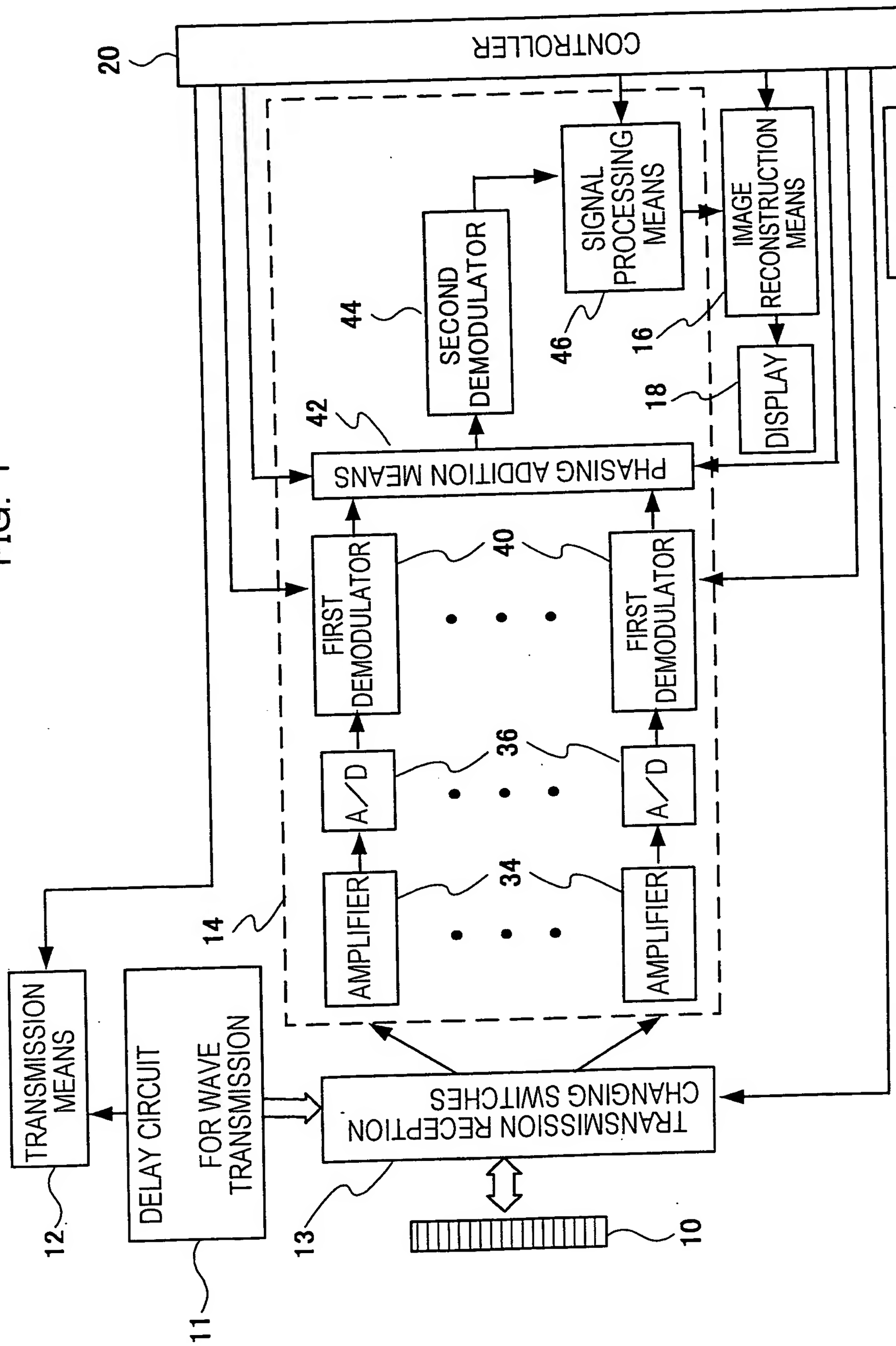

20
CONTROLLER
SIGNAL PROCESSING MEANS
IMAGE RECONSTRUCTION MEANS
INPUT MEANS
SECOND DEMODULATOR
44
46
16
9
DISPLAY
18
42
PHASING ADDITION MEANS
FIRST DEMODULATOR
40
A/D
36
AMPLIFIER
34
14
TRANSMISSION MEANS
12
DELAY CIRCUIT FOR WAVE TRANSMISSION
11
TRANSMISSION RECEPTION CHANGING SWITCHES
13
10

FIG. 2

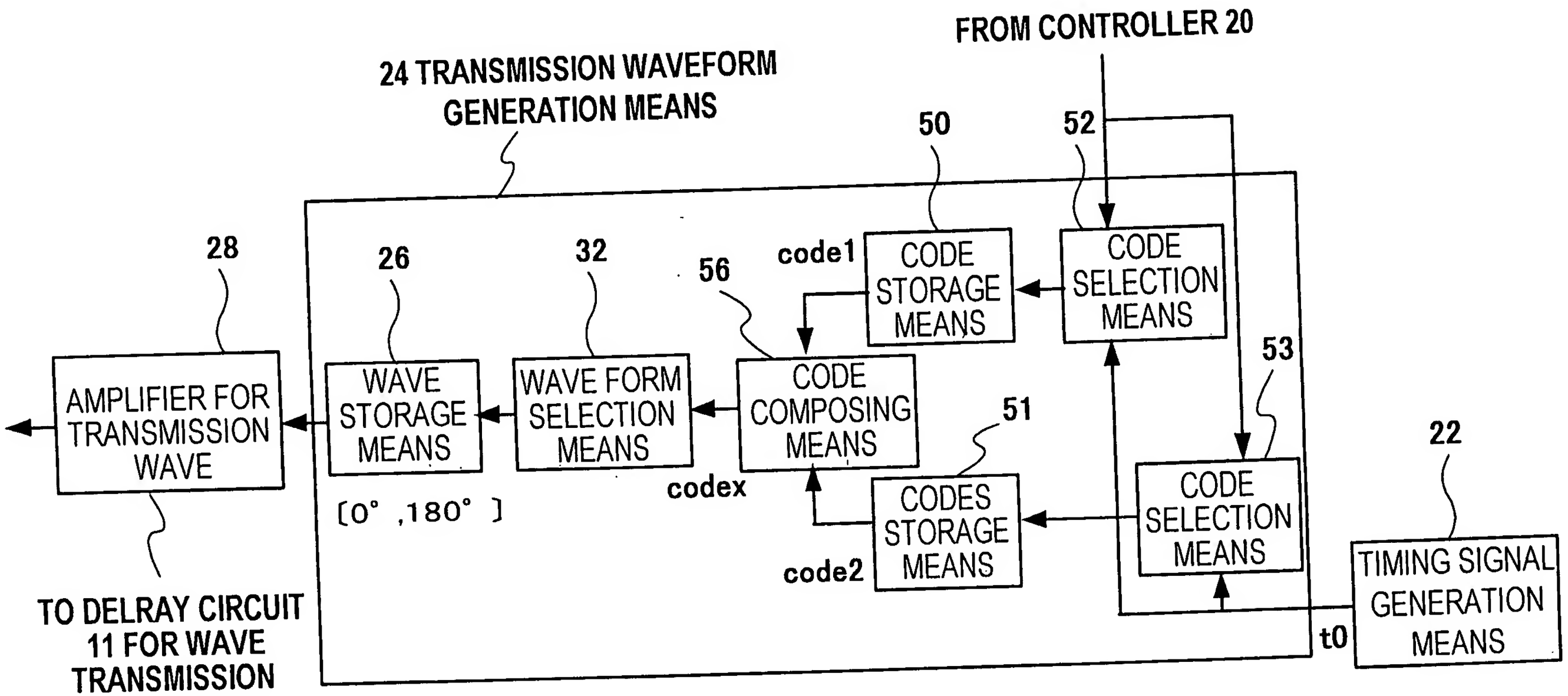
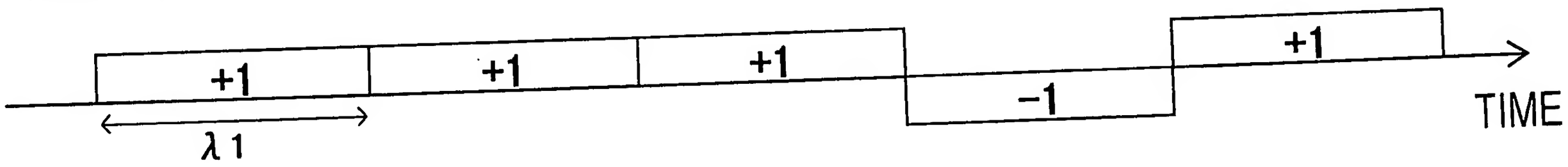

12
FROM CONTROLLER 20
24 TRANSMISSION WAVEFORM GENERATION MEANS
50
52
28
26
32
56
code1
CODE STORAGE MEANS
CODE SELECTION MEANS
53
AMPLIFIER FOR TRANSMISSION WAVE
WAVE STORAGE MEANS
WAVE FORM SELECTION MEANS
CODE COMPOSING MEANS
51
22
[0° ,180°]
codex
CODES STORAGE MEANS
CODE SELECTION MEANS
code2
TIMING SIGNAL GENERATION MEANS
t0
TO DELRAY CIRCUIT 11 FOR WAVE TRANSMISSION

FIG. 3

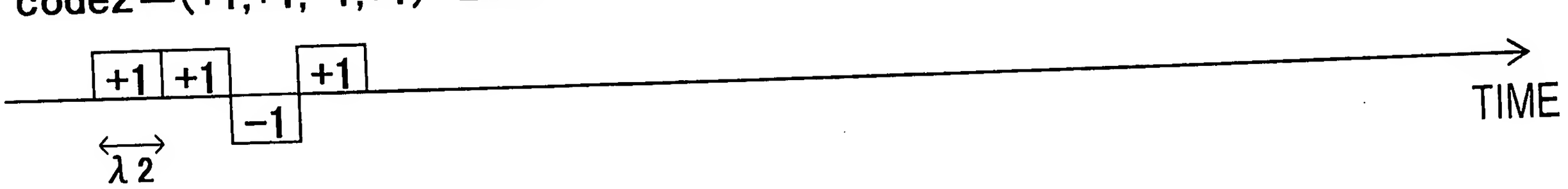
BARKER CODE

code1=(+1,+1,+1,−1,+1) L1=5



BARKER CODE (GOLAY CODE)

code2=(+1,+1,−1,+1) L2=4



codeX={(+1,+1,−1,+1), (+1,+1,−1,+1), (+1,+1,−1,+1), (−1,−1,+1,−1), (+1,+1,−1,+1)} Lx=20

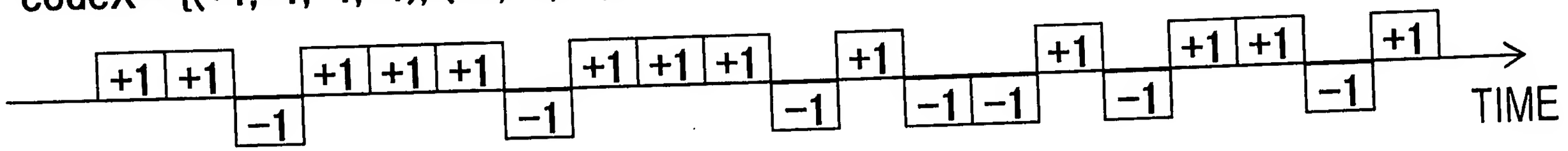


FIG. 4

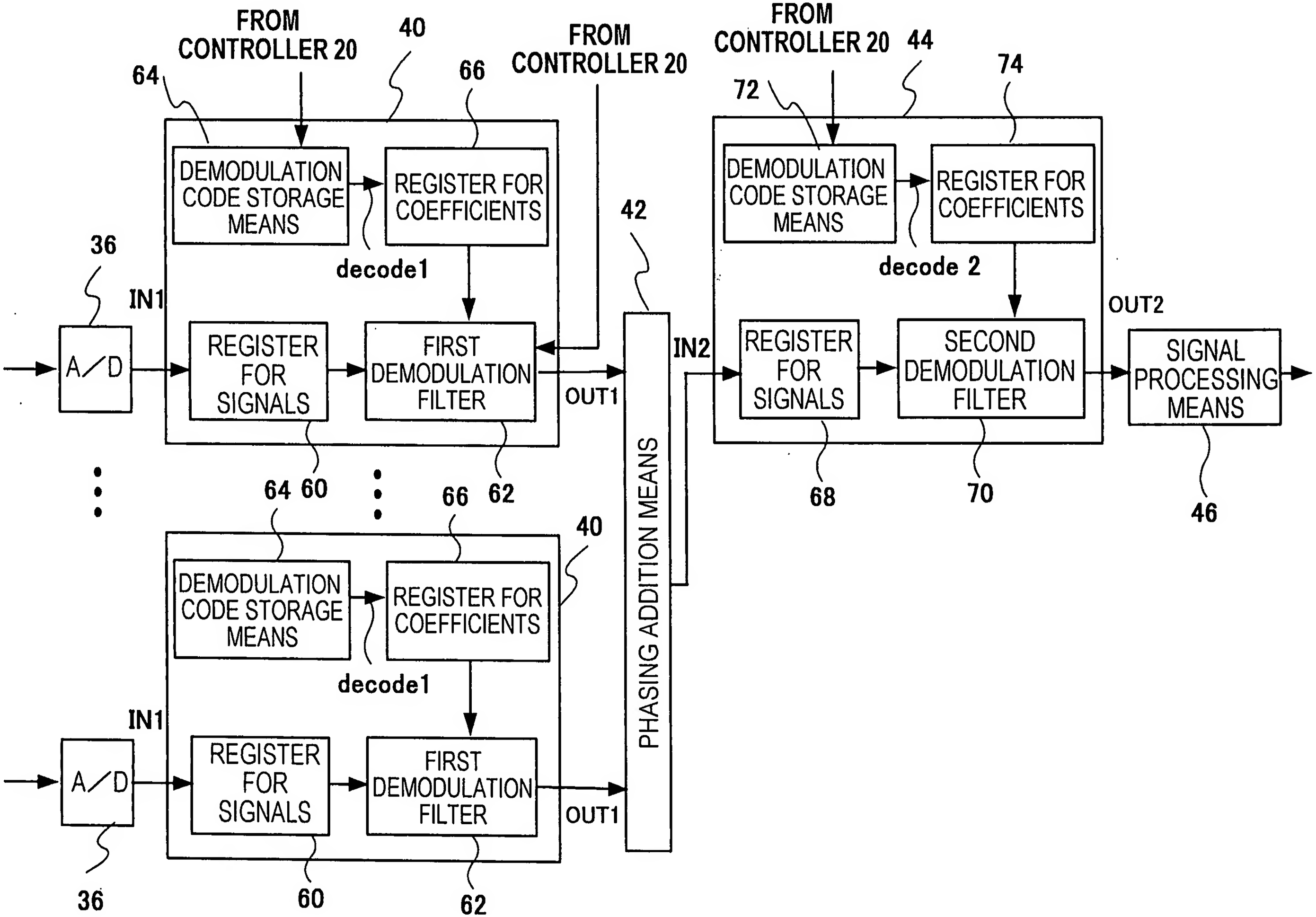

FROM CONTROLLER 20
40
64
66
DEMODULATION CODE STORAGE MEANS
REGISTER FOR COEFFICIENTS
decode1
36
IN1
A/D
REGISTER FOR SIGNALS
FIRST DEMODULATION FILTER
OUT1
42
FROM CONTROLLER 20
FROM CONTROLLER 20
44
72
74
DEMODULATION CODE STORAGE MEANS
REGISTER FOR COEFFICIENTS
decode 2
OUT2
IN2
REGISTER FOR SIGNALS
SECOND DEMODULATION FILTER
SIGNAL PROCESSING MEANS
PHASING ADDITION MEANS
64 60
66 62
68
70
46
40
DEMODULATION CODE STORAGE MEANS
REGISTER FOR COEFFICIENTS
decode1
IN1
A/D
REGISTER FOR SIGNALS
FIRST DEMODULATION FILTER
OUT1
36
60
62

FIG. 5

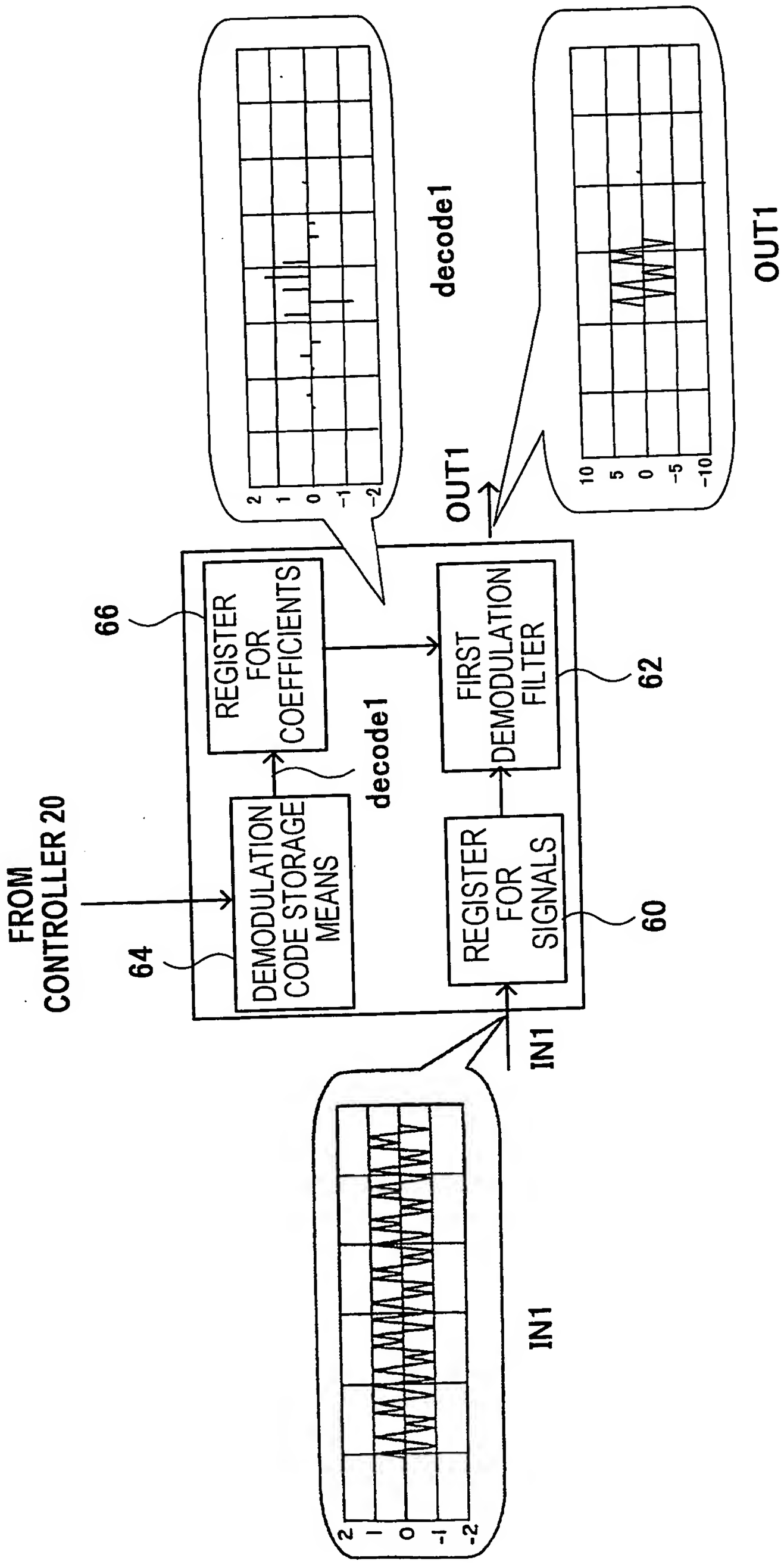

FROM CONTROLLER 20
64
DEMODULATION CODE STORAGE MEANS
66
REGISTER FOR COEFFICIENTS
decode1
decode1
FIRST DEMODULATION FILTER
62
REGISTER FOR SIGNALS
60
IN1
IN1
2 1 0 -1 -2
OUT1
OUT1
10 5 0 -5 -10
2 1 0 -1 -2

FIG. 6

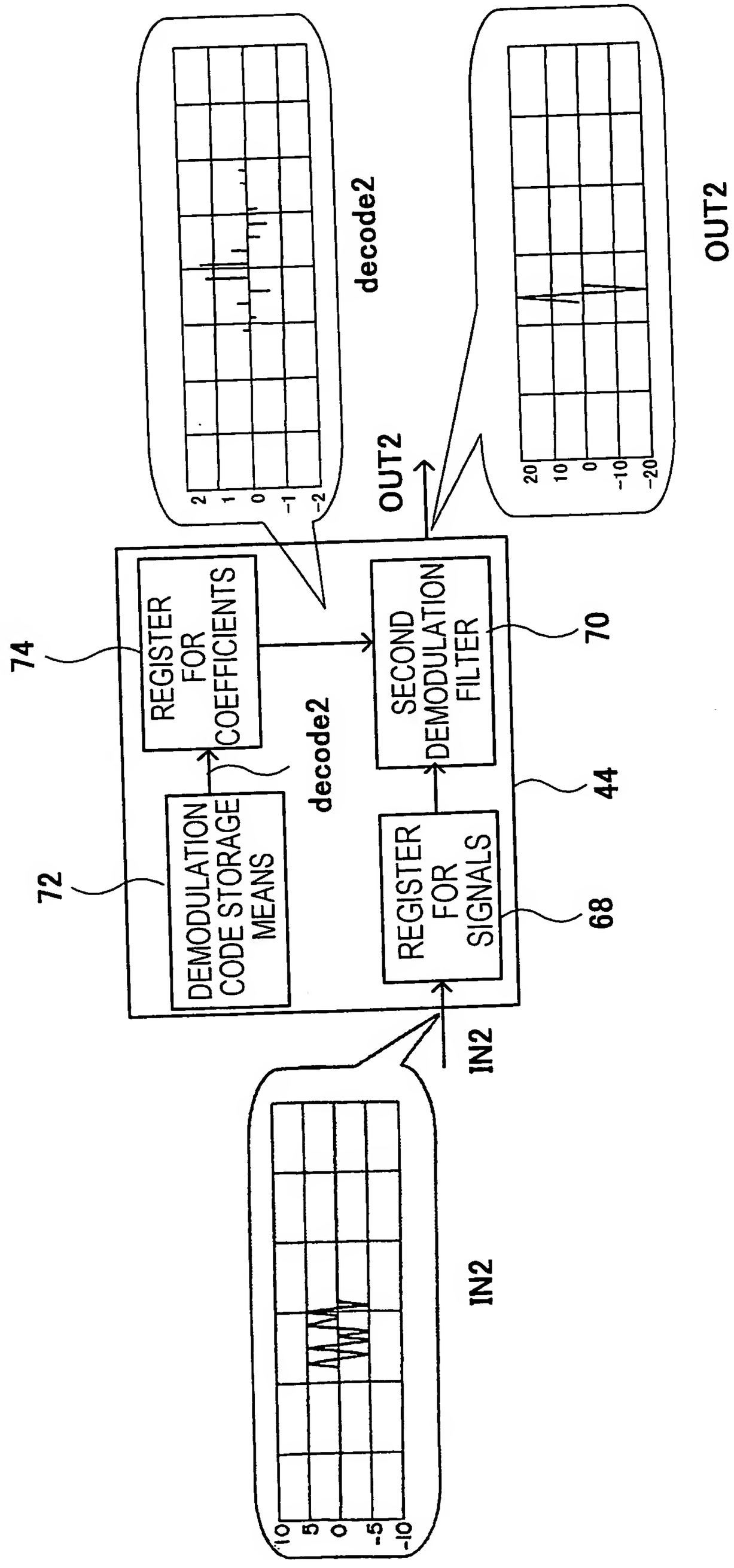
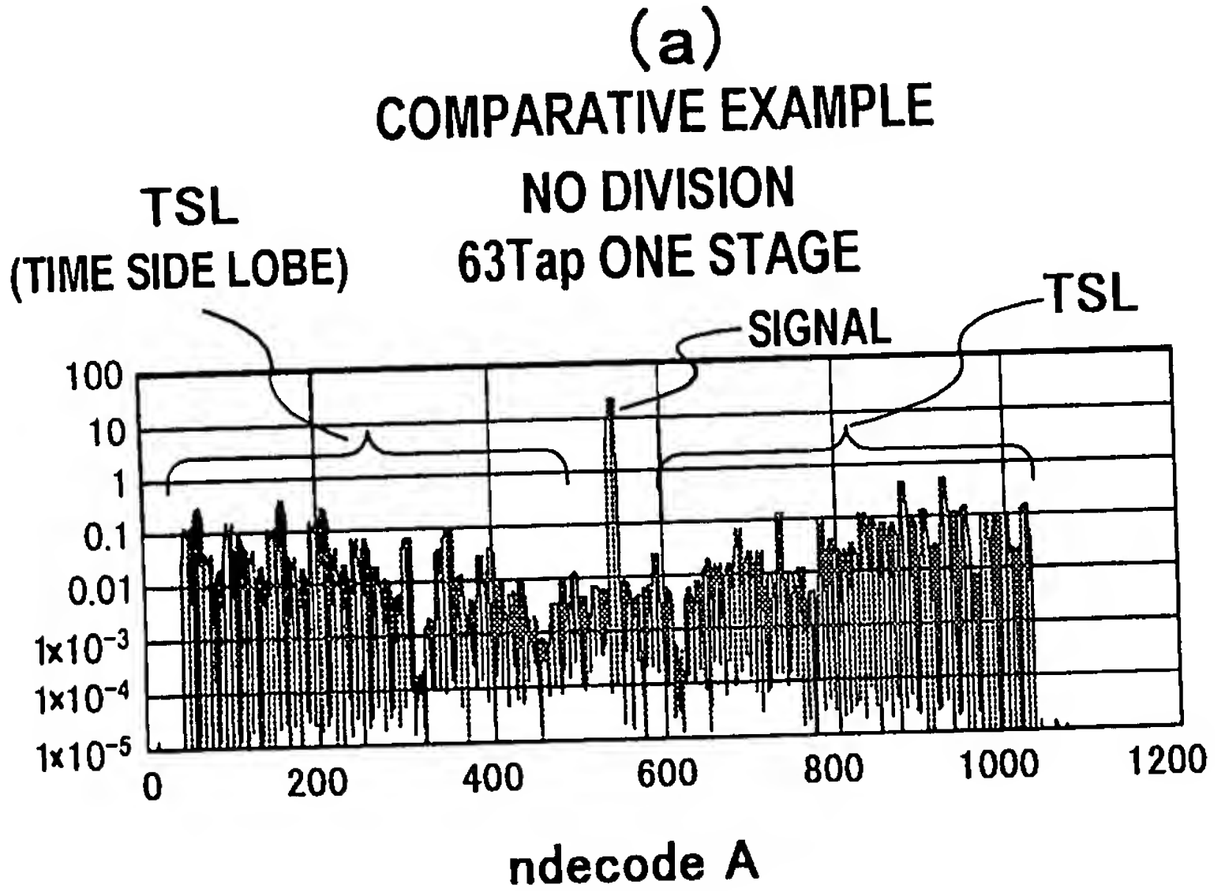
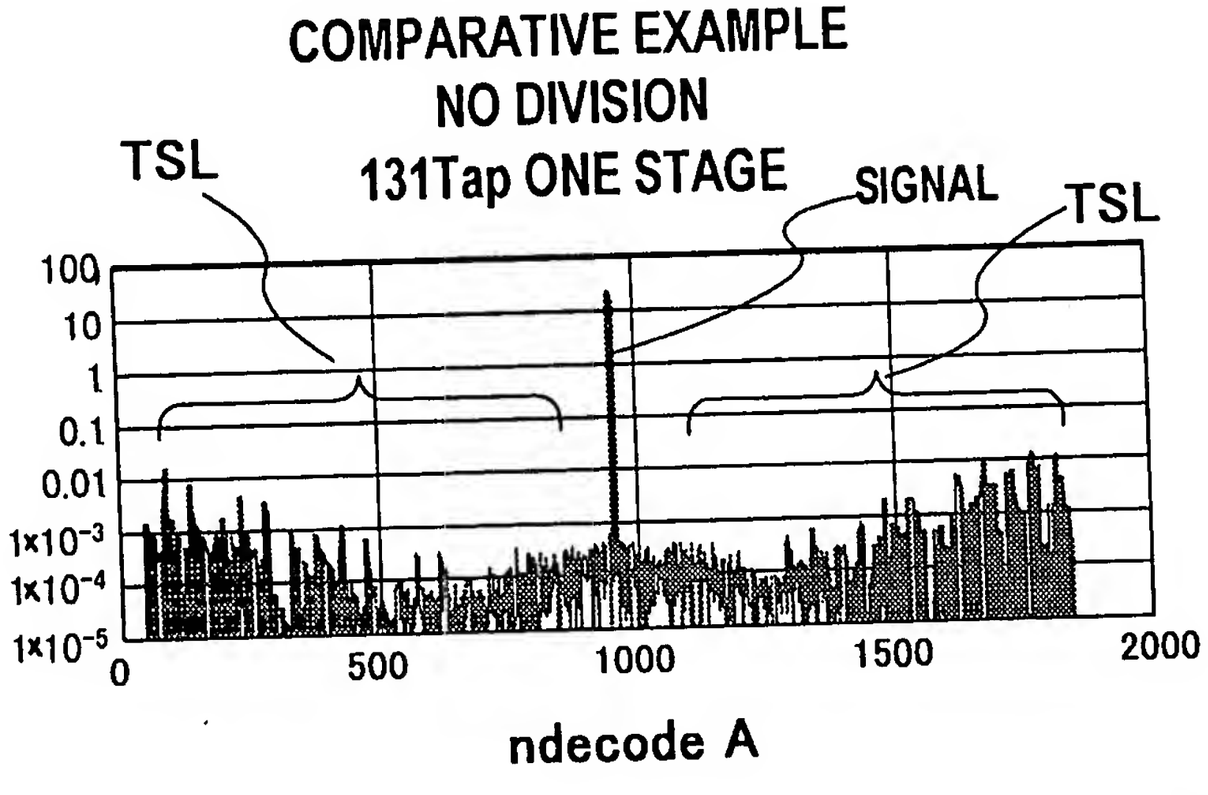

decode2
OUT2
2
1
0
-1
-2
20
10
0
-10
-20
OUT2
74
REGISTER FOR COEFFICIENTS
SECOND DEMODULATION FILTER
70
decode2
72
DEMODULATION CODE STORAGE MEANS
44
REGISTER FOR SIGNALS
68
IN2
IN2
10
5
0
-5
-10

FIG. 7

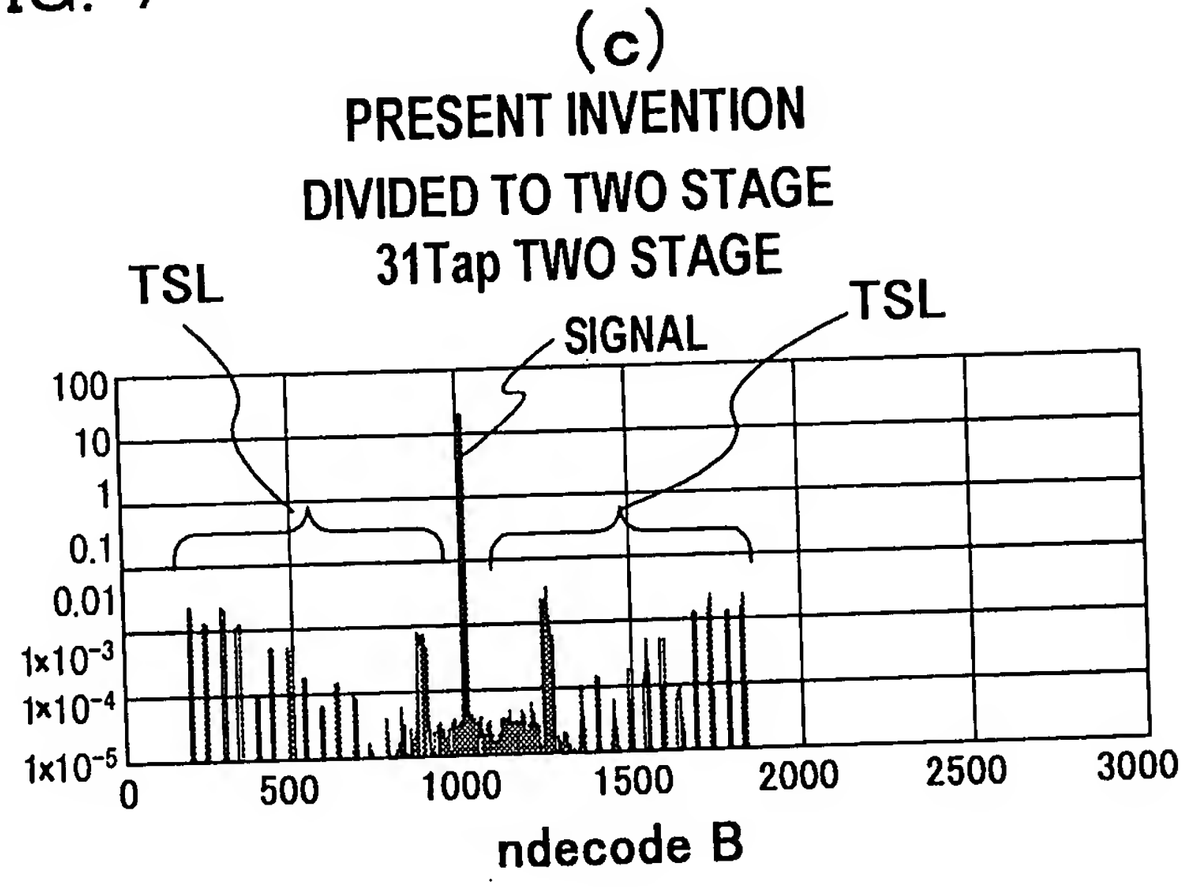
(a)



(b)



(c)



BEST AVAILABLE COPY

FIG. 8

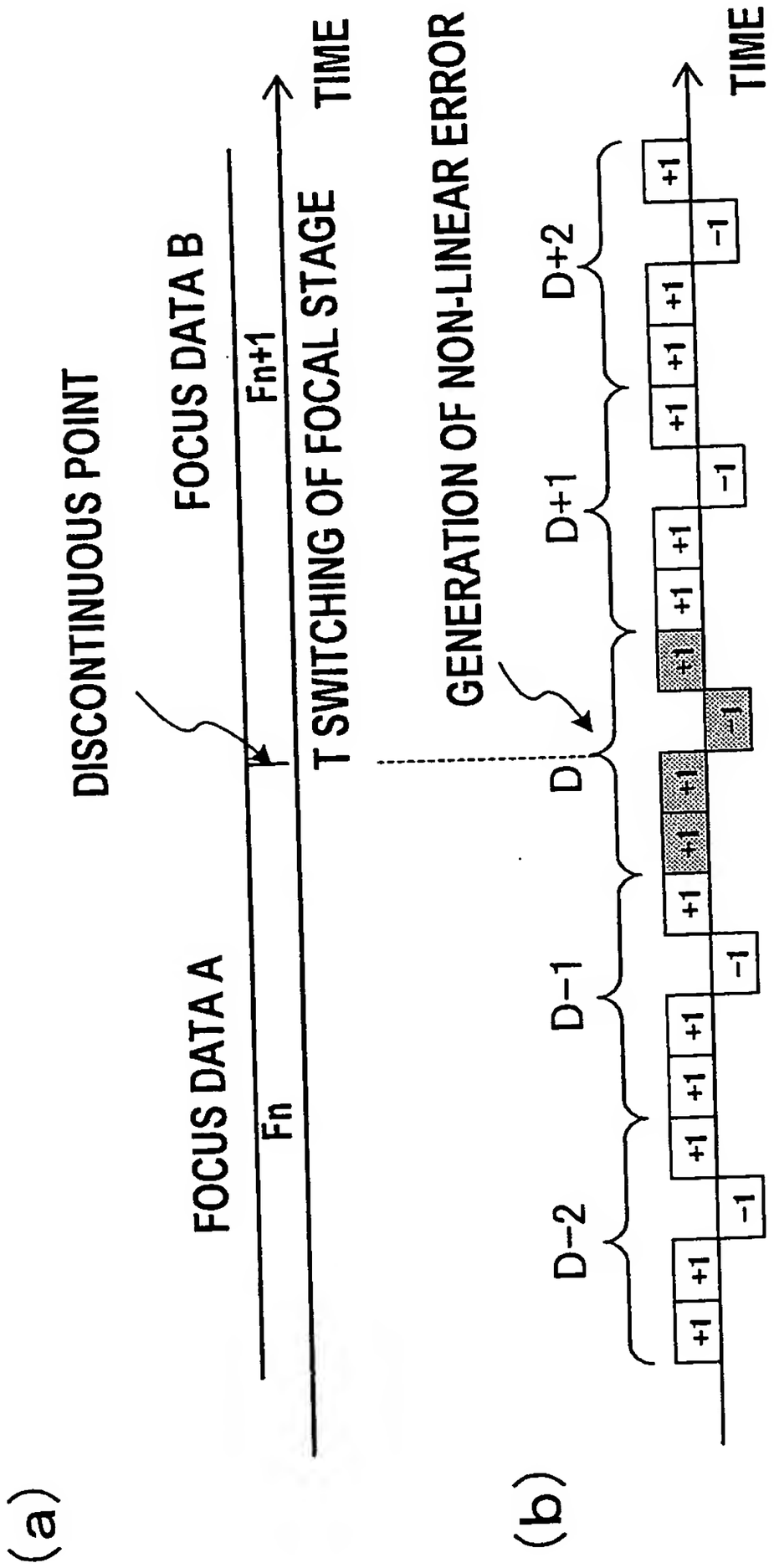
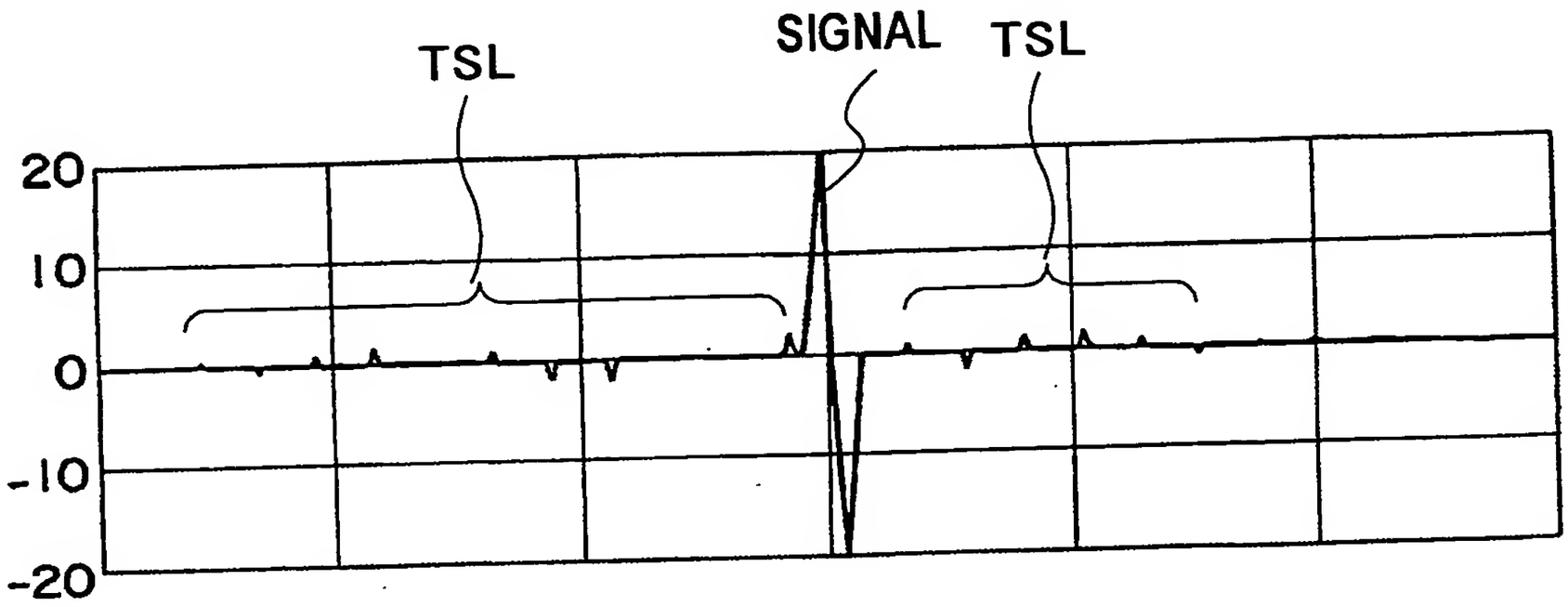

(a)
FOCUS DATA A
Fn
DISCONTINUOUS POINT
FOCUS DATA B
Fn+1
T SWITCHING OF FOCAL STAGE
TIME
(b)
GENERATION OF NON-LINEAR ERROR
D−2
D−1
D
D+1
D+2
+1
−1
TIME

FIG. 9

(a)



(b)

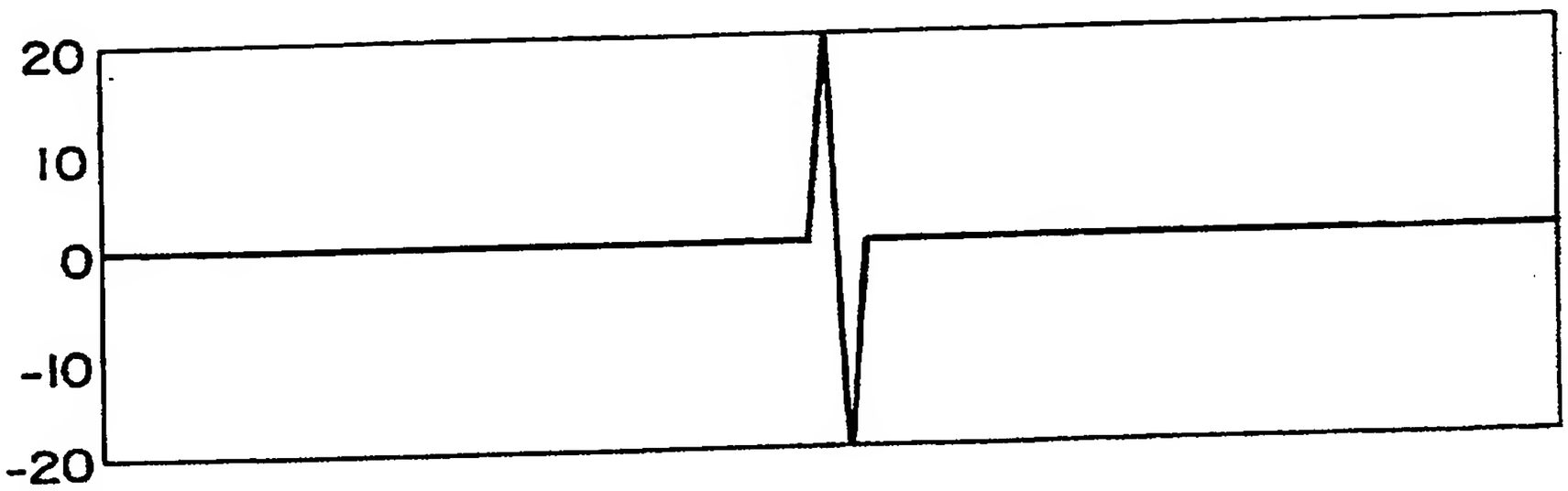


FIG. 10

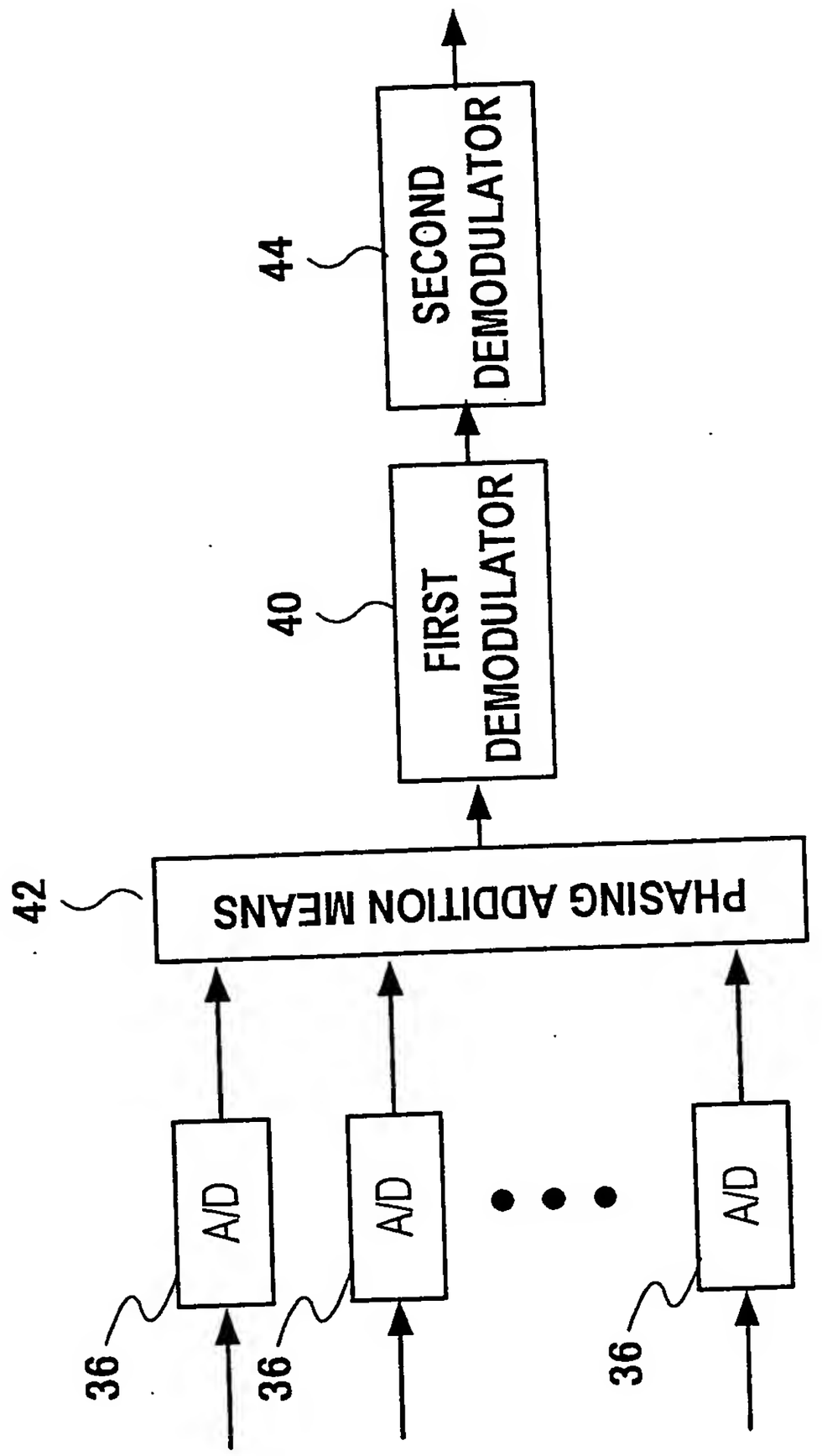

44
SECOND DEMODULATOR
40
FIRST DEMODULATOR
42
PHASING ADDITION MEANS
A/D
A/D
A/D
36
36
36

FIG. 11

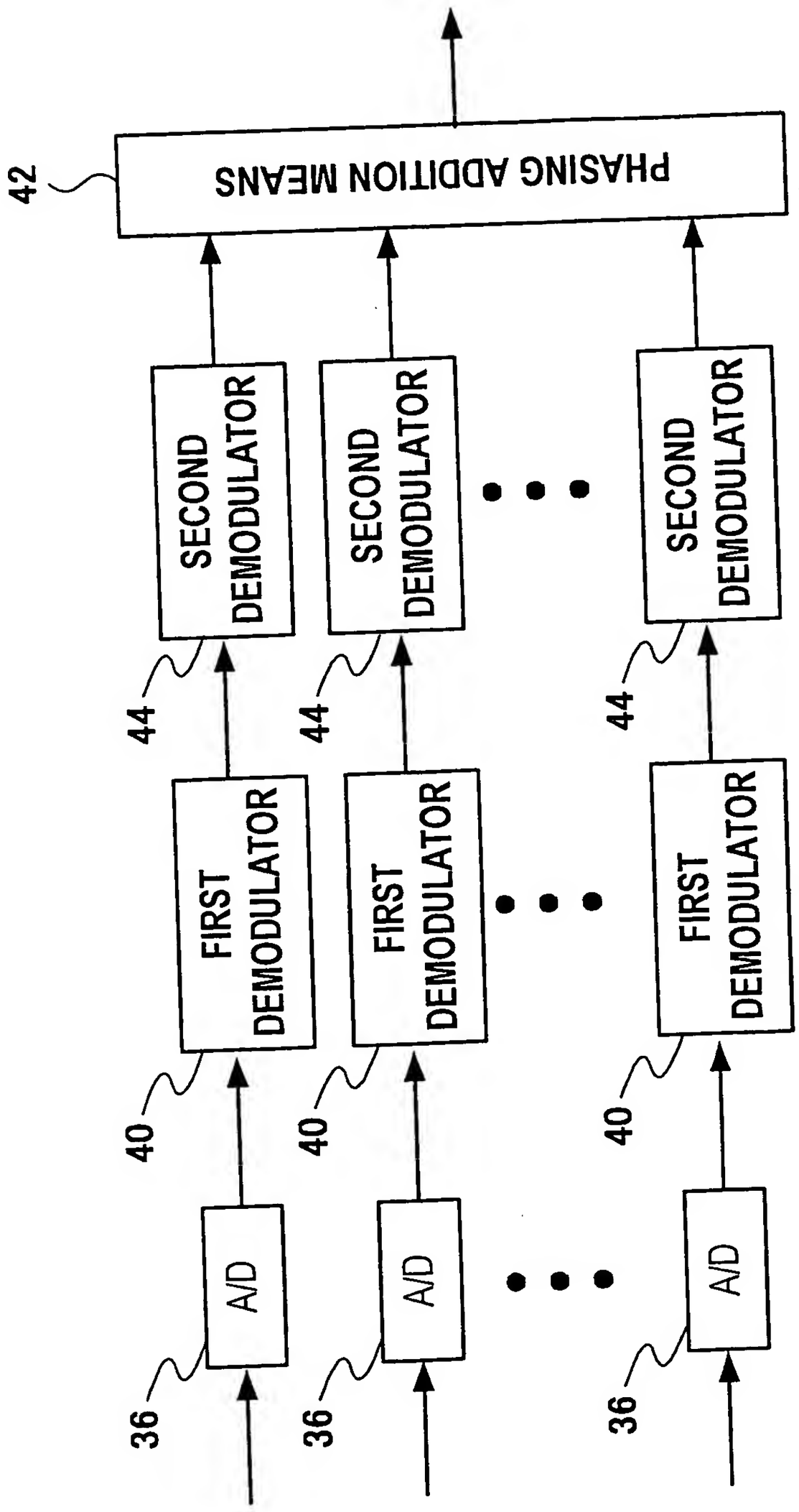

PHASING ADDITION MEANS
42
SECOND DEMODULATOR
FIRST DEMODULATOR
A/D
44
40
36

FIG. 12

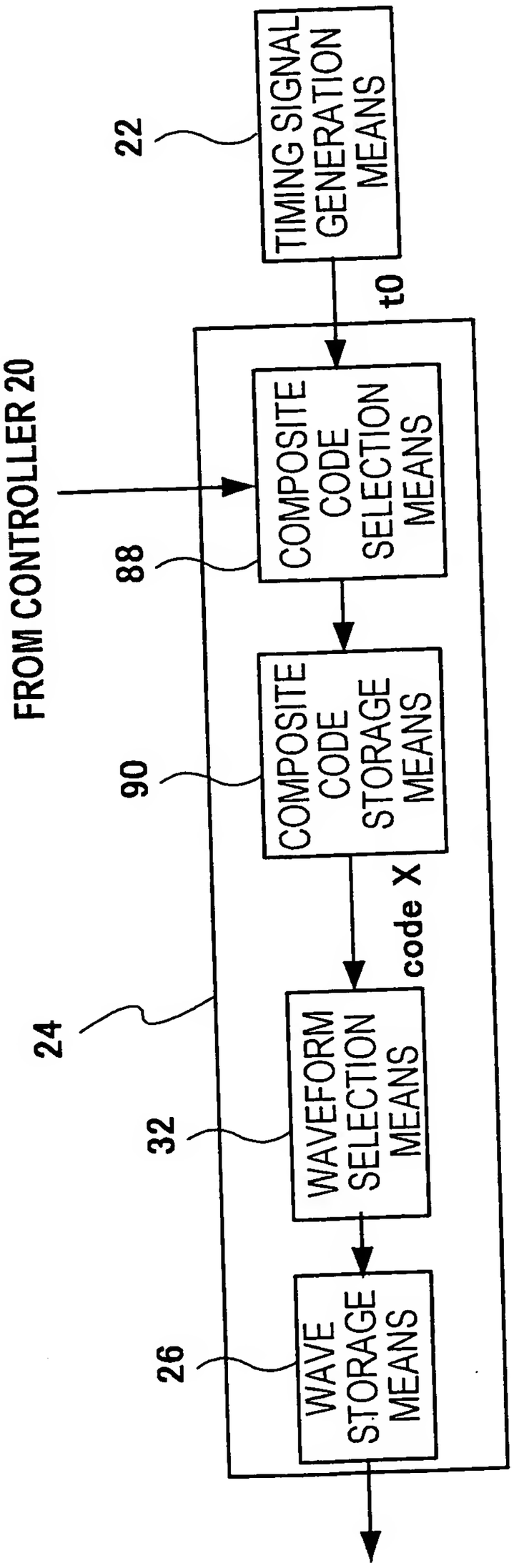
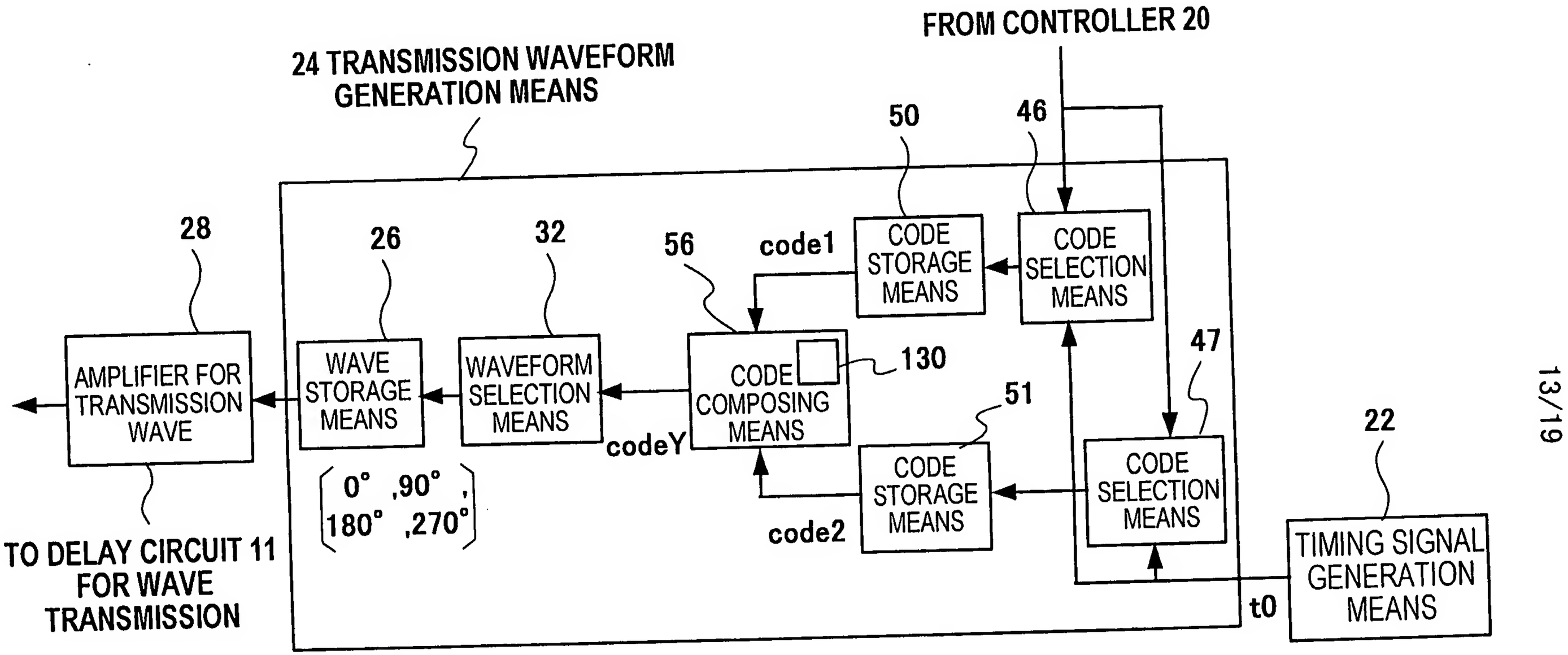

22
TIMING SIGNAL GENERATION MEANS
t0
FROM CONTROLLER 20
88
COMPOSITE CODE SELECTION MEANS
90
COMPOSITE CODE STORAGE MEANS
code X
24
32
WAVEFORM SELECTION MEANS
26
WAVE STORAGE MEANS

FIG. 13

(a)


12
FROM CONTROLLER 20
24 TRANSMISSION WAVEFORM GENERATION MEANS
50
46
28
26
32
56
code1
CODE STORAGE MEANS
CODE SELECTION MEANS
47
130
AMPLIFIER FOR TRANSMISSION WAVE
WAVE STORAGE MEANS
WAVEFORM SELECTION MEANS
CODE COMPOSING MEANS
codeY
51
22
0° ,90° ,
180° ,270°
CODE STORAGE MEANS
CODE SELECTION MEANS
code2
TIMING SIGNAL GENERATION MEANS
TO DELAY CIRCUIT 11 FOR WAVE TRANSMISSION
t0

(b)

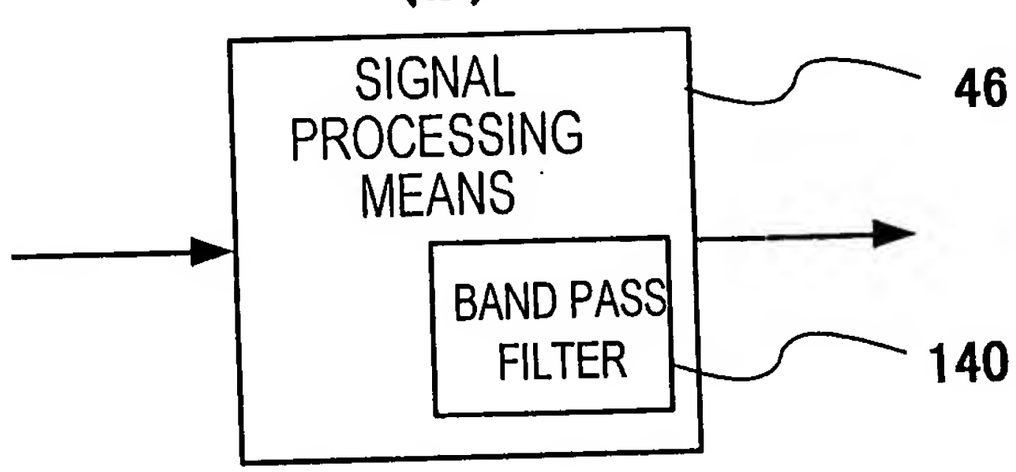

SIGNAL PROCESSING MEANS
46
BAND PASS FILTER
140

FIG. 14

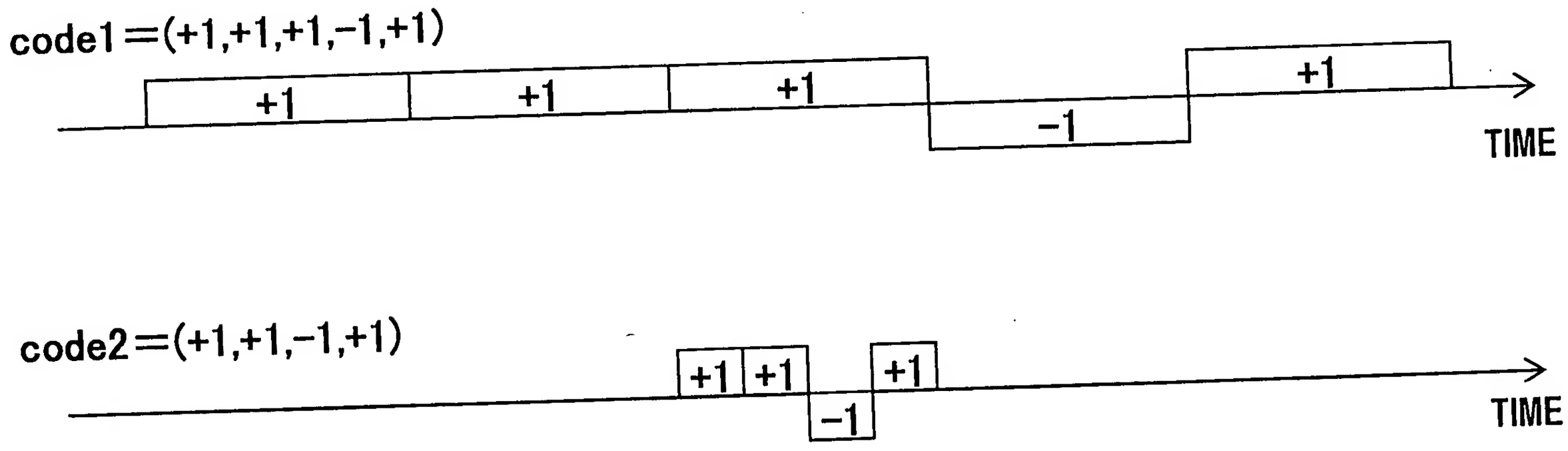

code1=(+1,+1,+1,−1,+1)
+1
+1
+1
−1
+1
TIME
code2=(+1,+1,−1,+1)
+1
+1
−1
+1
TIME
codeX={+1x(+1,+1,−1,+1), +1x(+1,+1,−1,+1), +1x(+1,+1,−1,+1), −1x(+1,+1,−1,+1), +1x(+1,+1,−1,+1)}
+1
+1
−1
+1
+1
+1
−1
+1
+1
+1
−1
+1
−1
−1
(−1)²
−1
+1
+1
−1
+1
TIME
DEGREE= 0 0 1 0 0 0 1 0 0 0 1 0 1 1 2 1 0 0 1 0
FIRST
15TH CODE ELEMENT

FIG. 15

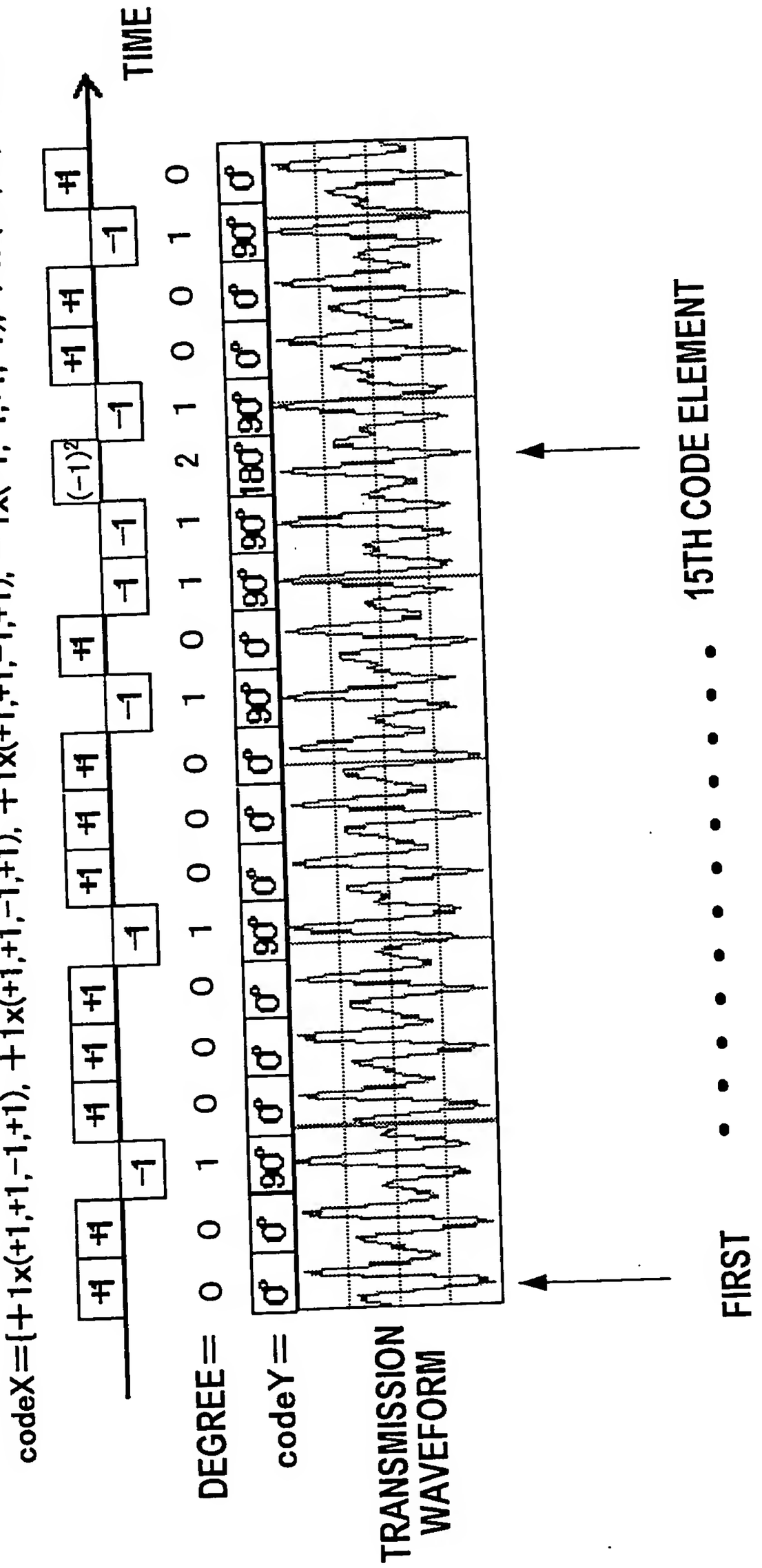

TIME
codeX={+1x(+1,+1,+1,+1,+1,+1,+1), +1x(+1,+1,+1,−1,−1,−1,+1), +1x(+1,+1,−1,−1,−1,+1,−1), −1x(−1,−1,+1,+1,+1,−1,−1), +1x(+1,+1,−1,+1,−1,+1,+1), +1x(+1,+1,−1,−1,+1,−1,+1), −1x(−1,−1,+1,−1,+1,+1,+1), +1x(+1,+1,+1,+1,+1,+1,+1)}
DEGREE= 0 0 1 0 0 0 1 0 1 1 1 2 1 0 0 1 0
codeY=
TRANSMISSION WAVEFORM
FIRST
15TH CODE ELEMENT

FIG. 16

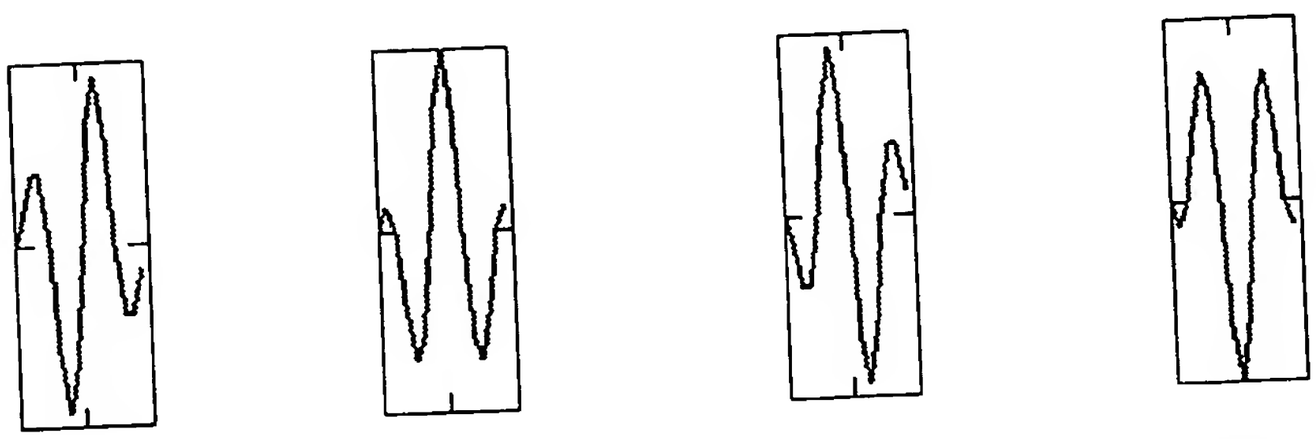


FIG. 17

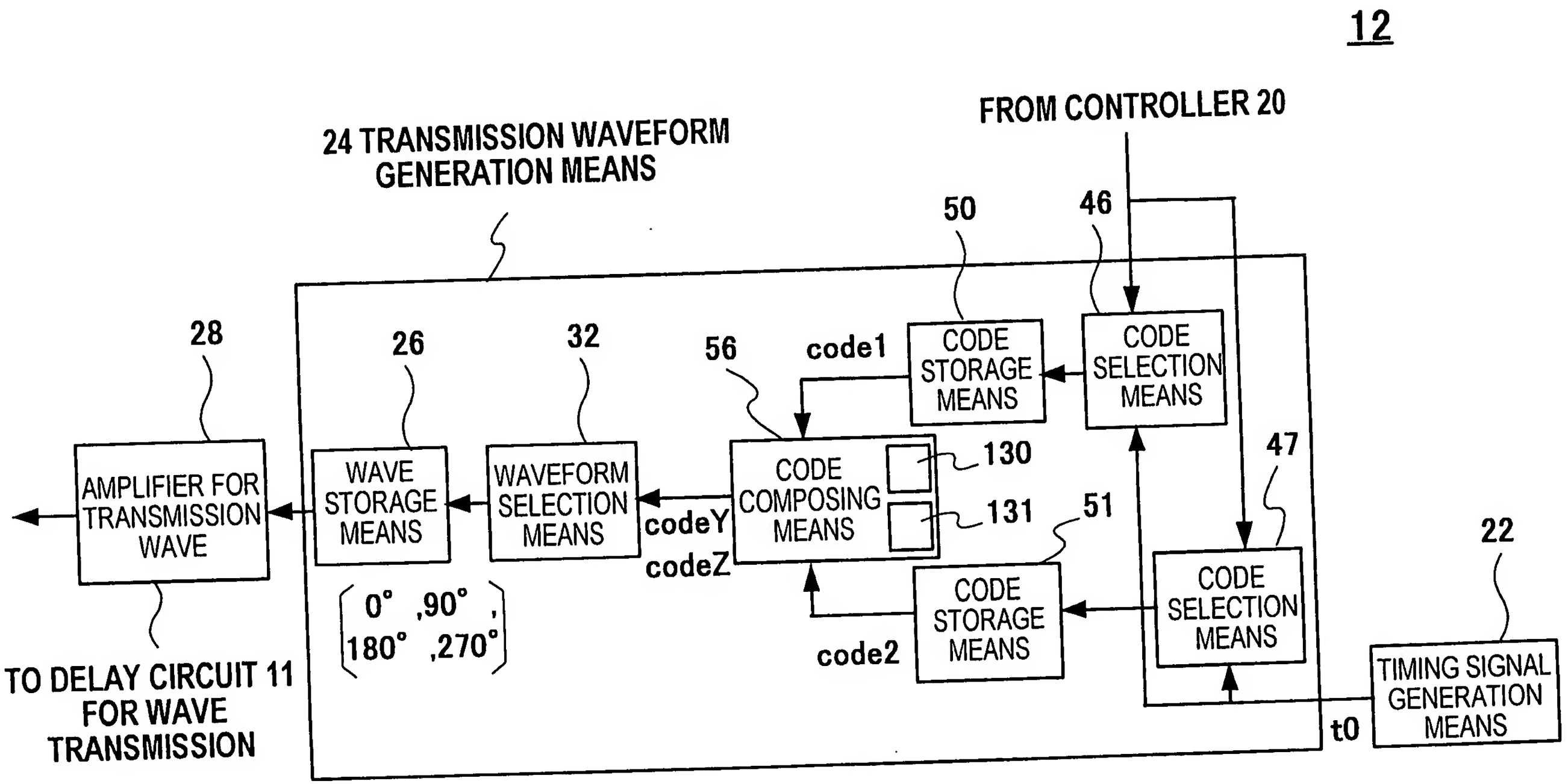

12
24 TRANSMISSION WAVEFORM GENERATION MEANS
FROM CONTROLLER 20
50
46
28
26
32
56
code1
CODE STORAGE MEANS
CODE SELECTION MEANS
AMPLIFIER FOR TRANSMISSION WAVE
WAVE STORAGE MEANS
WAVEFORM SELECTION MEANS
CODE COMPOSING MEANS
130
131
47
51
22
codeY
codeZ
0° ,90° ,
180° ,270°
code2
CODE STORAGE MEANS
CODE SELECTION MEANS
TIMING SIGNAL GENERATION MEANS
t0
TO DELAY CIRCUIT 11 FOR WAVE TRANSMISSION

FIG. 18

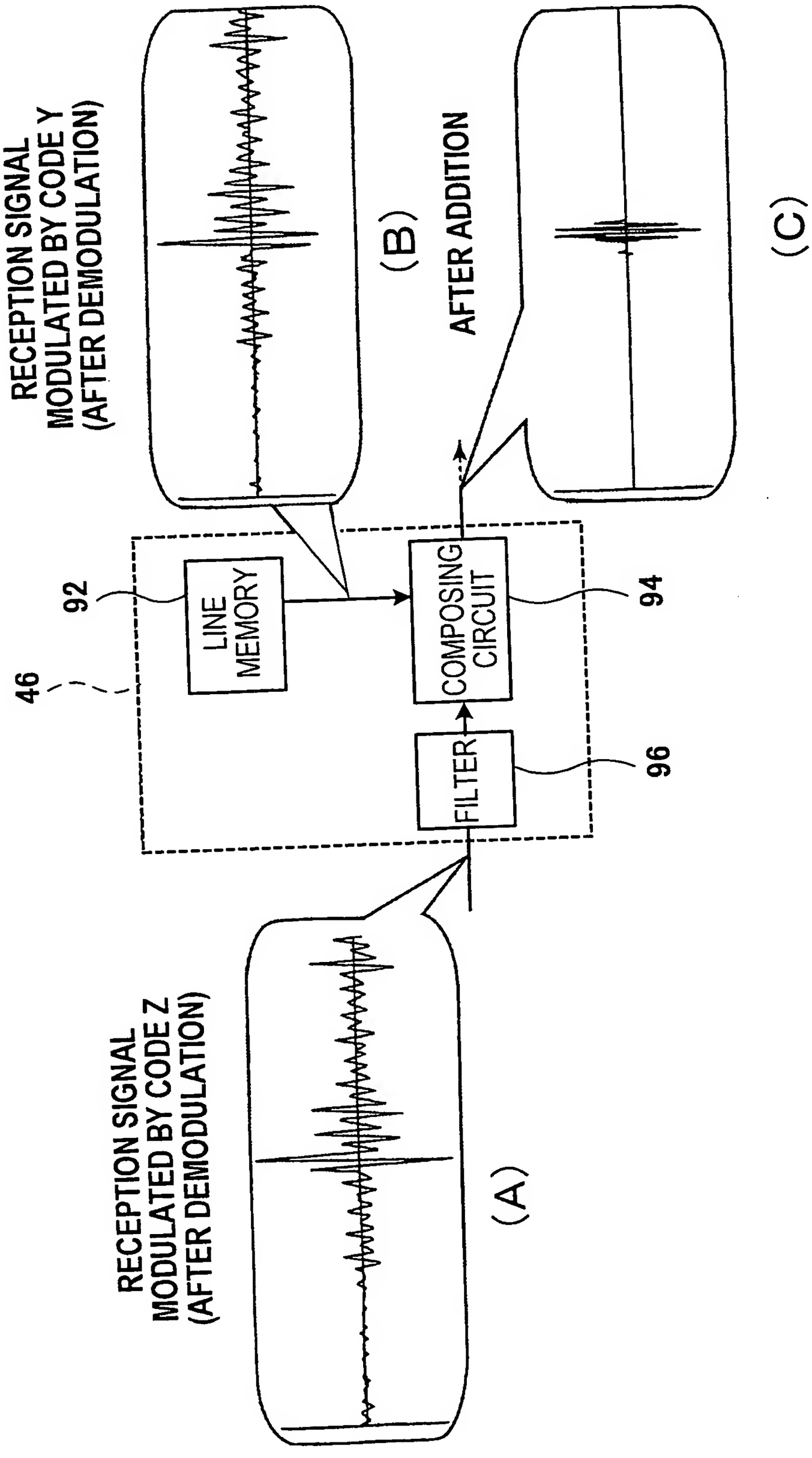
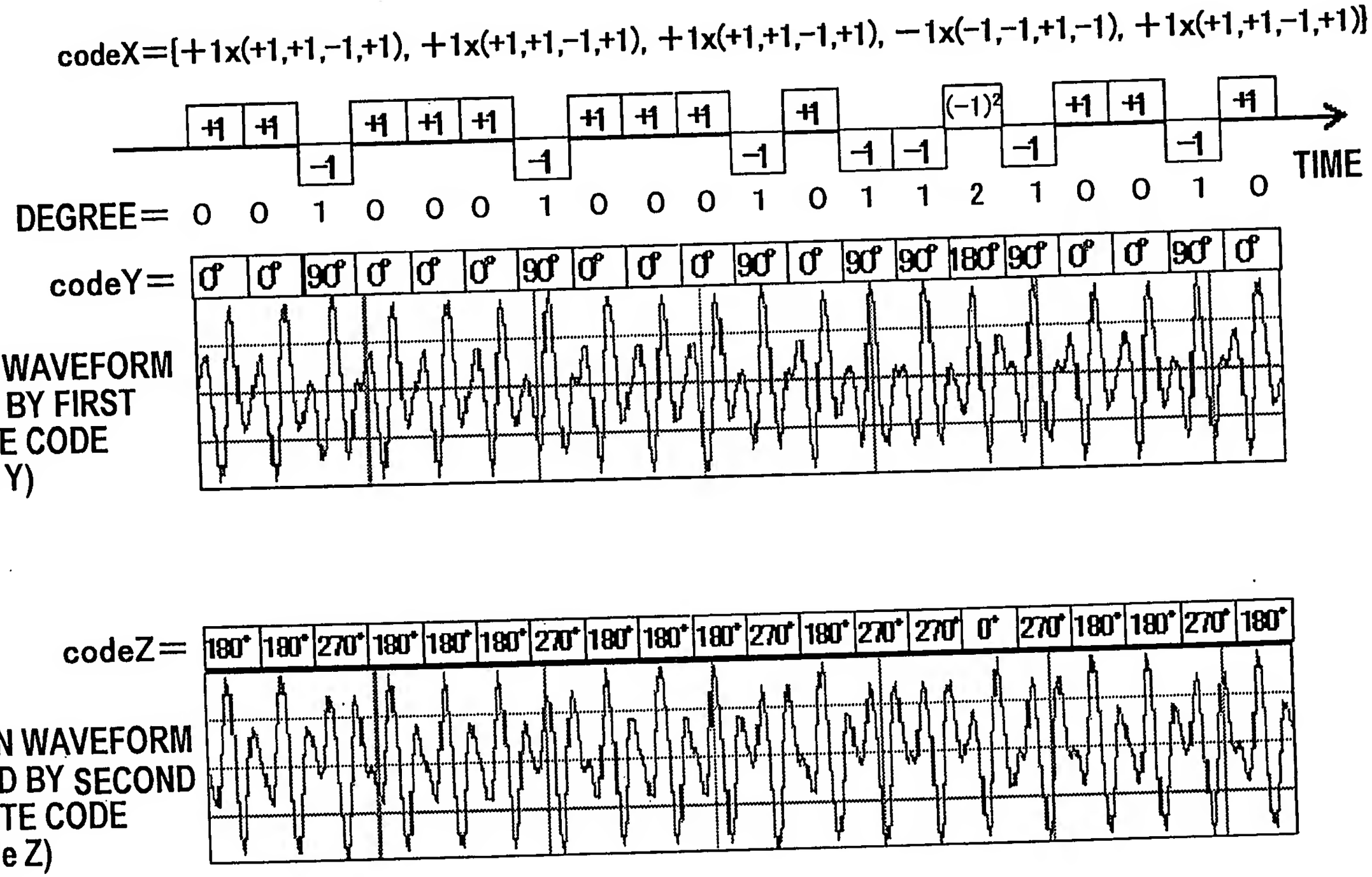

RECEPTION SIGNAL
MODULATED BY CODE Z
(AFTER DEMODULATION)
(A)
RECEPTION SIGNAL
MODULATED BY CODE Y
(AFTER DEMODULATION)
(B)
AFTER ADDITION
(C)
46
92
LINE MEMORY
COMPOSING CIRCUIT
94
FILTER
96

FIG. 19


codeX={+1x(+1,+1,−1,+1), +1x(+1,+1,−1,+1), +1x(+1,+1,−1,+1), −1x(−1,−1,+1,−1), +1x(+1,+1,−1,+1)}
+1 +1 −1 +1 +1 +1 −1 +1 +1 +1 −1 +1 −1 −1 (−1)² −1 +1 +1 −1 +1
TIME
DEGREE= 0 0 1 0 0 0 1 0 0 0 1 0 1 1 2 1 0 0 1 0
codeY=
0° 0° 90° 0° 0° 0° 90° 0° 0° 0° 90° 0° 90° 90° 180° 90° 0° 0° 90° 0°
TRANSMISSION WAVEFORM MODULATED BY FIRST COMPOSITE CODE (code Y)
codeZ=
180° 180° 270° 180° 180° 180° 270° 180° 180° 180° 270° 180° 270° 270° 0° 270° 180° 180° 270° 180°
TRANSMISSION WAVEFORM MODULATED BY SECOND COMPOSITE CODE (code Z)